Improving the generic range for agro ecological innovation adoption. An application to improved fallows in Martinique

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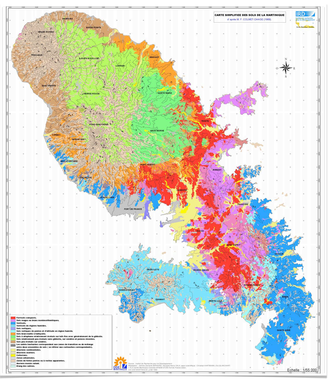
The problem of the generic range

Agro-ecological innovations face the problem of their generic range which results in small adoption rates at large scales. The generic range can be improved with a stratified sampling procedure and an assessment of the capacity of an agro ecological innovation to adapt to the local agro ecological and social constraints.



Using classification statistics for stratified sampling

We tested this approach in Martinique, a tropical island of the French West Indies. The case study involved improved fallows for vegetable production.

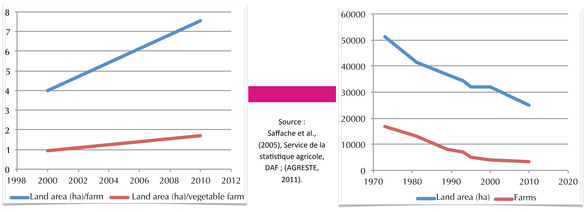


Figure 1. The agricultural transformation of agriculture in Martinique

A participatory approach identified several potential adoption determinants.

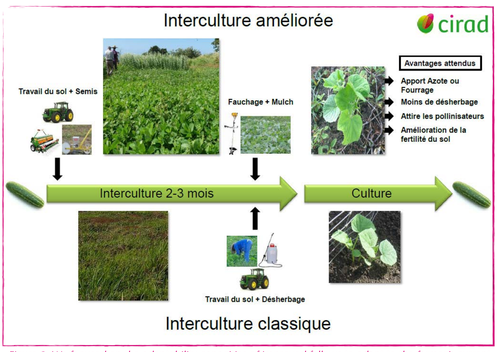


Figure 2. We focused on the adaptability capacities of improved fallows to adapt to the farmer's current practices and different agro ecological zones in Martinique.

Based on the national agricultural census database (RGA 2010), we divided the total 1382 population of vegetable farmers in Martinique into 6 homogeneous subgroups involved completely or partially in vegetable production. Field interviews were performed to test the results of the participatory approach.

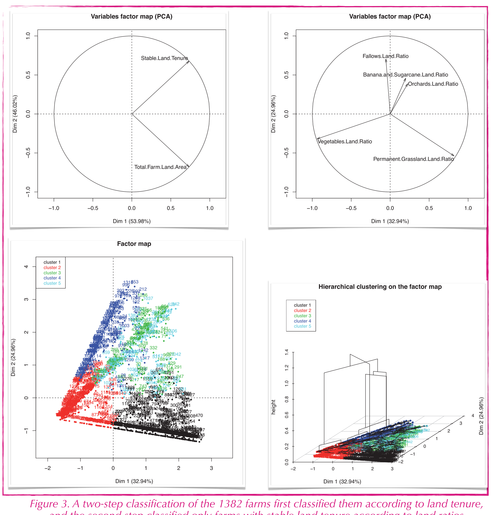


Figure 3. A two-step classification of the 1382 farms first classified them according to land tenure, and the second step classified only farms with stable land tenure according to land ratios devoted to different production profiles (2013, Martinique).

Generic range and risks of exclusion

The participatory approach suggested land ownership and land size as the two key pre requisites for an ex ante assessment of improved fallows diffusion. Therefore, the participatory approach identified 2 promising sub-groups: livestock farms and Banana / sugarcane farms which can be considered as mechanized farms and livestock farms.

In green, the potential adopters willing to test improved fallows.
In red, the potential population excluded from improved fallows.

Variable	Unstable land tenure farms (306 farms)		Stable land tenure farms: Main production orientation (number of farms)								Total farms (1382)	
			Livestock, vegetable (337)		Banana, sugarcane, vegetable (96)		Pure vegetable (392)		Fallows, vegetable (162)		Orchards, vegetable (89)			
	Mean	sd	Mean	Sd	Mean	sd	Mean	sd	Mean	sd	Mean	sd	Mean	sd
Total cultivated land (ha)	3.0	2.5	5.0	5.0	3.7	3.4	2.5	2.2	4.4	5.7	4.0	4.0	3.6	4.0
Stable land tenure (%)	2	8	99	5	99	5	96	5	99	5	99	5	79	41
Vegetable production (%)	55	32	28	16	27	19	87	14	40	18	34	19	55	32
Permanent grasslands (%)	-	-	65	17	-	-	-	-	-	-	-	-	22	30
Banana, sugarcane (%)	-	-	-	-	55	19	-	-	-	-	-	-	8	17
Fallows (%)	-	-	-	-	-	-	-	-	51	15	-	-	9	19
Orchards (%)	-	-	-	-	-	-	-	-	-	-	47	18	5	14

s.d. = standard deviation - = < 15%

The field interviews among 27 mechanized farms and livestock farms revealed that 74% of them expressed a willingness to test the improved fallows. This is about one third of the total population of the 1382 farmers involved in vegetable farming.

The unstable land tenure farm group and the pure vegetable farm group were considered as potentially not concerned because of the absence of land titles or insufficient land size. This is about half of the total population of the 1382 farmers involved in vegetable farming. Specific stratified samplings for such groups are required to reduce exclusion.

Promoting adaptability and the number of agro ecological packages

The risks of exclusion can be reduced by improving the generic range of agro ecological innovations through adaptability and larger portfolios of innovation packages.

Some agro ecological innovations may not be fitted for every type of farms. There are risks of diminishing returns in research and diffusion in this case. A farming system approach could overcome conservative postures, promote trust, and improve diffusion.

The stakeholders involved in agricultural policies need to put agro ecological innovations into the perspective of the agricultural transformation and consider the risks of exclusion.

Selected references

Agreste. 2011. Données Martinique premières tendances. Direction de l'alimentation de l'agriculture et de la forêt de la Martinique. Service de l'information statistique économique et prospective. 16 pages.

Geniaux G., Latruffe L., Lepoutre J., Mzoughi N., Napoléone C., Nauges C., Sainte-Beuve J., Sauteau N., 2010. Les déterminants de la conversion à l'AB : une revue de la littérature économique. Projets INRA AgriBio3. Livrable 1. 20p.

Saffache, P., Blanchart, É., Cabidoche, Y., Josien, É., Michalon, T., Saudubray, F., Scherer, C., 2005. Contexte de l'agriculture martiniquaise : atouts et contraintes pour l'agriculture biologique In : Agriculture biologique en Martinique : Quelles perspectives de développement ? Montpellier : IRD Éditions.

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